

What Is Claimed Is:

1. A continuous speech recognition apparatus,
comprising:

5 a first storage section for storing a tree structure
dictionary and a context preceding to the tree structure
dictionary therein;

a second storage section for storing speech part
information of all succeeding words of individual arcs in the
tree structure dictionary therein;

10 a third storage section having connection rules of speech
part information stored therein;

hypothesis expansion discrimination means for referring
to the connection rules of speech part information stored in
said third storage section to discriminate, with regard to each
15 arc on which a hypothesis is present, whether or not connection
between the context of the tree structure dictionary and a
succeeding word of the arc is possible and determining based
on a result of the discrimination whether or not the hypothesis
should be expanded;

20 hypothesis expansion means for performing expansion of
the hypothesis in response to an expansion instruction from
said hypothesis expansion discrimination means;

whereby the hypothesis is not expanded to the arc of any
word which does not connect to the context.

25 2. A continuous speech recognition apparatus,
comprising:

a hypothesis storage section for storing hypotheses therein;

hypothesis expansion discrimination means for determining whether or not a hypothesis may be expanded to a succeeding arc;

a tree structure dictionary storage section for storing a tree structure dictionary and a context preceding to the tree structure dictionary therein;

a succeeding word speech part information storage section for storing information of whether or not speech parts are included in all of succeeding words present behind each of arcs in the tree structure dictionary;

a speech part connection information storage section for storing connection information between the speech parts;

means for providing a language model score to a hypothesis;

means for providing an acoustic model score to a hypothesis; and

hypothesis expansion means operable in response to an expansion instruction received from said hypothesis expansion discrimination means for acquiring a structure of an arc from said tree structure dictionary storage section and expanding a hypothesis present on the arc to a succeeding arc taking the acoustic model score and the language model score into consideration and then storing a result of the expansion into said hypothesis storage section.

3. A continuous speech recognition apparatus as claimed
in claim 2, wherein said speech part connection information
storage section stores connection information of the speech
parts in the descending order of the speech parts in appearance
5 frequency.

4. A continuous speech recognition apparatus as claimed
in claim 2, wherein said succeeding word speech part
information storage section stores the information of whether
or not the speech parts are included in all of succeeding words
10 present behind each of the arcs in the tree structure dictionary
in the descending order of the speech parts in appearance
frequency.

5. A continuous speech recognition apparatus as claimed
in claim 2, wherein said succeeding word speech part storage
15 section stores succeeding word speech part information
regarding only those of the arcs in the tree structure
dictionary each of which immediately succeeds a node.

6. A continuous speech recognition apparatus as claimed
in claim 2, wherein said hypothesis expansion discrimination
20 means receives speech part information of the context of the
tree structure dictionary on which the hypothesis is being
expanded from said tree structure dictionary storage section,
receives speech part information of all succeeding words to
an arc immediately succeeding the arc which has the hypothesis
25 from said succeeding word speech part information storage
section, refers to said speech part connection information

storage section to discriminate from the received information whether or not the context and the succeeding words can be connected to each other, and delivers, if at least one of the succeeding words is connectable to the context, an instruction
5 to said hypothesis expansion means to expand the hypothesis to the succeeding arc, but delivers, if all of the succeeding words to the arc are not connectable to the context, an instruction to said hypothesis expansion means not to expand the hypothesis without performing expansion of the hypothesis
10 to the succeeding arc.

7. A continuous speech recognition apparatus according to claim 2, wherein said hypothesis expansion discrimination means omits, if a hypothesis is already present on the succeeding arc to which the hypothesis is tried to be expanded,
15 the processing of referring to the connection rules of speech parts and delivers an instruction to said hypothesis expansion means to expand the hypothesis to the succeeding arc.

8. A continuous speech recognition method, comprising the steps of:
20 storing speech part information of succeeding words to arcs in a tree structure dictionary therein;
referring to connection rules of speech part information set and stored in advance to discriminate, with regard to each arc, whether or not connection of the context of the tree
25 structure dictionary and a succeeding word of the arc and determining based on a result of the discrimination whether

or not a hypothesis should be expanded; and

expanding the hypothesis to the arc of any word other than a word which does not connect to the context.

8 9. A continuous speech recognition method for a
5 continuous speech recognition apparatus which includes a
hypothesis storage section for storing hypotheses therein, a
tree structure dictionary storage section for storing a tree
structure dictionary and a context preceding to the tree
structure dictionary therein, a succeeding word speech part
10 information storage section for storing information of whether
or not speech parts are included in all of succeeding words
present behind each of arcs in the tree structure dictionary,
and a speech part connection information storage section for
storing connection information between the speech parts,
15 comprising the step of:

repeating a process for all of hypotheses present at a
certain frame time, the process including the steps of:

acquiring a context of a tree structure dictionary to
which a hypothesis belongs from said tree structure dictionary
20 storage section;

acquiring speech part connection information of the
speech parts of the context from said speech part connection
information storage section;

acquiring arcs in the tree structure dictionary to which
25 the hypothesis belongs from said hypothesis storage section;
and

repeating, for all succeeding arcs immediately succeeding the arcs, a process including the steps of:

acquiring, where an arc selected at present is represented as first arc and a succeeding arc immediately succeeding the first arc is represented as second arc, succeeding work speech part information of the second arc from said succeeding word speech part information storage section;

discriminating from the acquired speech part connection information and the acquired succeeding word speech part information whether or not the hypothesis may be expanded from the first arc to the second arc and determining that the hypothesis must not be expanded to the second arc if a connectable speech part included in the speech part connection information is not detected behind the second arc, but determining otherwise that the hypothesis may be expanded to the second arc;

expanding the hypothesis to the second arc; and

discriminating whether or not the loop has been completed for all of the hypotheses and ending, when the loop has been completed for all of the hypotheses, the expanding processing of the hypotheses of the frame in a frame synchronous beam search.

9 10. A recording medium on which a program is recorded for being executed by a computer included in a continuous speech recognition apparatus which includes a hypothesis storage section for storing hypotheses therein, a tree structure

dictionary storage section for storing a tree structure
dictionary and a context preceding to the tree structure
dictionary therein, a succeeding word speech part information
storage section for storing information of whether or not
5 speech parts are included in all of succeeding words present
behind each of arcs in the tree structure dictionary, and a
speech part connection information storage section for storing
connection information between the speech parts, the program
comprising the step of:

10 repeating a process for all of hypotheses present at a
certain frame time, the process including the steps of:

acquiring a context of a tree structure dictionary to
which a hypothesis belongs from said tree structure dictionary
storage section;

15 acquiring speech part connection information of the
speech parts of the context from said speech part connection
information storage section;

acquiring arcs in the tree structure dictionary to which
the hypothesis belongs from said hypothesis storage section;
20 and

repeating, for all succeeding arcs immediately
succeeding the arcs, a process including the steps of:

acquiring, where an arc selected at present is
represented as first arc and a succeeding arc immediately
25 succeeding the first arc is represented as second arc,
succeeding work speech part information of the second arc from

said succeeding word speech part information storage section;

discriminating from the acquired speech part connection information and the acquired succeeding word speech part information whether or not the hypothesis may be expanded from

5 the first arc to the second arc and determining that the hypothesis must not be expanded to the second arc if a connectable speech part included in the speech part connection information is not detected behind the second arc, but determining otherwise that the hypothesis may be expanded to
10 the second arc;

expanding the hypothesis to the second arc; and

discriminating whether or not the loop has been completed for all of the hypotheses and ending, when the loop has been completed for all of the hypotheses, the expanding processing
15 of the hypotheses of the frame in a frame synchronous beam search.